Paper No. 25

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Ex parte KAREN P. SHRIER; GERALD R. BEHLING;
JAMES B. INTRATER; KAILASH C. JOSHI; and WILLIAM W. ALSTON, JR.

Appeal No. 2002-0510
Application No. 09/139,309

HEARD: Feb. 11, 2003

Before THOMAS, BARRY, and LEVY, *Administrative Patent Judges*.

BARRY, *Administrative Patent Judge*.

DECISION ON APPEAL

A patent examiner rejected claims 5-20 and 30-32. The appellants appeal therefrom under 35 U.S.C. § 134(a).[1] We affirm-in-part.

BACKGROUND

The invention at issue on appeal protects electronic circuits and equipment from overvoltage transients caused by lightning, electromagnetic pulses, electrostatic discharges, or power surges. Voltage transients can induce high currents and voltages

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[1]The appellants do not argue the rejections of claim 29. (Appeal Brief, pages 3 and 5). Accordingly, the appeal is dismissed as to this claim.

that can penetrate and damage electrical circuits and equipment. Such voltage transients produce large voltage spikes with high peak currents, i.e., overvoltage. (Spec. at 1.)

According to the appellants, variable voltage materials are used commonly in variable voltage protection devices to short overvoltage transients to ground. (Appeal Br. at 3.) Such materials initially display a high electrical resistance. When an associated device experiences an overvoltage transient, its variable voltage material changes to a low electrical resistance, thereby directing excess current harmlessly to ground. After the transient has passed, the material reverts to the high electrical resistance. (*Id.*)

The appellants explain that the key operational parameters of a variable voltage material are "response time," "clamp voltage," and "switch voltage." Response time is the time it takes for the material to switch from high resistance to low resistance. (*Id.*) Clamp voltage is the voltage at which the material limits a voltage surge. (*Id.* at 2-3.) After the material switches to a low resistance, it ensures that the circuit or equipment being protected will not be subjected to a voltage greater than the clamp voltage. (Spec. at 2.) Switch voltage is the voltage at which the variable voltage material will switch under surge conditions from high resistance to low resistance. (Appeal Br. at 4.)

The appellants' invention comprises embodiments of a variable voltage protection component for placement between a ground plane (14) and an electronic circuit (10). Figure 2 of their specification shows an embodiment featuring a variable voltage material layer (13) and a neat dielectric polymer or glass layer (12). According to the appellants, use of the neat dielectric polymer or glass layer (12) improves clamp voltage properties. (*Id.*)

Figure 3 of the specification shows a multi-layer embodiment. Three distinct layers (15, 16, 17) of variable voltage material, each layer having a different material composition, are included. More specifically, the loading of conductive or semiconductive particles dispersed within the resin constituting the variable voltage material is varied from layer to layer. This variation is described in terms of percentage of particles by volume. The appellants assert that such variation achieves a wide range of clamping voltages. (*Id.*)

A further understanding of the invention can be achieved by reading the following claims.

> 5. A variable voltage protection component for placement between a ground plane and an electronic circuit comprising:
>
> a layer of variable voltage material comprising a binder containing conductive particles and/or semiconductive particles; and

a layer of neat dielectric polymer or glass distinct from the layer of variable voltage material and in contact with one surface of the layer of variable voltage material,

wherein the neat dielectric polymer or glass layer is present in a thickness of less than about 1.6 mils.

11. A variable voltage protection component for placement between a ground plane and an electronic circuit comprising:

a first layer of variable voltage protection material comprising a binder having dispersed therein at least about 20% by volume of conductive or semiconductive particles;

a second layer of variable voltage protection material in contact with the first layer comprising a binder having dispersed therein at least 40 % by volume of conductive and/or semiconductive particles; and

a third layer of variable voltage protection material in contact with said second layer comprising a binder having dispersed therein at least 20 % by volume of conductive or semiconductive particles.

Claims 5-20 and 30-32 stand rejected under 35 U.S.C. § 112, ¶ 2, as indefinite. Claims 5-10 and 31 stand rejected under 35 U.S.C. § 102(b) as anticipated by U.S. Patent No. 4,041,436 ("Kouchich"). Claims 5-10 stand rejected under 35 U.S.C. § 103(a) as obvious over U.S. Patent No. 5,278,535 ("Xu"). Claims 11-16 stand rejected under § 103(a) as obvious over U.S. Patent No. 1,509,496 ("Slepian") and U.S. Patent No. 5,476,714 ("Hyatt"). Claims 11-20 and 31 stand rejected under § 103(a) as obvious over U.S. Patent No. 3,310,766 ("Downing") and Hyatt. Claims 17-20 and 31

stand rejected under § 103(a) as obvious over Slepian, Hyatt, and U.S. Patent No. 2,295,379 ("Beck") and over Downing, Hyatt, and Beck.

OPINION

Our opinion addresses the following rejections:

- indefiniteness rejection of claims 5-20 and 30-32
- anticipation rejection of claims 5-10 and 31 over Kouchich
- obviousness rejection of claims 5-10 over Xu
- obviousness rejections of claims 11-16 over Slepian and Hyatt
- obviousness rejection of claims 11-20 over Downing and Hyatt
- obviousness rejections of claims 17-20 over Slepian, Hyatt, and Beck and over Downing, Hyatt, and Beck
- obviousness rejections of claim 31 over Downing and Hyatt; over Downing, Hyatt, and Beck; and over Slepian, Hyatt, and Beck.

Indefiniteness Rejection of Claims 5-20 and 30-32

Rather than reiterate the positions of the examiner or the appellants *in toto*, we address the five points of contention therebetween. First, the examiner had asserted, "[t]he term 'less than about' in claims 6-20 and . . . 32 is a relative term which renders the claim indefinite." (Examiner's Answer at 3.) The appellants argue, "[t]he phrase . . . can be understood from the specification without uncertainty to denote the parameters which would achieve component protection from overvoltage transients through

dissipation of excess charge via an electrical path established by the described and claimed layer configuration." (Appeal Br. at 7.) At the oral hearing, the examiner withdrew his assertion, conceding that the term "less than about" did not render the instant claims indefinite.

Second, the examiner asserts, " [i]n claim 5, it is not clear what 'distinct from the layer of variable voltage material' means. . . ." (Examiner's Answer at 3.) The appellants argue, "[t]he word 'distinct,' as its ordinary and accustomed meaning would suggest, along with the description in the specification in light of which the claims are to be read, simply means that the two layers are distinguishable from one another." (Appeal Br. at 8.)

"The test for definiteness is whether one skilled in the art would understand the bounds of the claim when read in light of the specification." *Miles Labs., Inc. v. Shandon Inc.*, 997 F.2d 870, 875, 27 USPQ2d 1123, 1126 (Fed. Cir. 1993) (citing *Orthokinetics Inc., v. Safety Travel Chairs, Inc.*, 806 F.2d 1565, 1576, 1 USPQ2d 1081, 1088 (Fed. Cir. 1986)). "The general rule is, of course, that terms in the claim are to be given their ordinary and accustomed meaning." *Johnson Worldwide Assocs., Inc. v. Zebco Corp.*, 175 F.3d 985, 989, 50 USPQ2d 1607, 1610 (Fed. Cir. 1999) (citing *Renishaw PLC v. Marposs Societa Per Azioni*, 158 F.3d 1243, 1249, 48 USPQ2d 1117, 1121 (Fed. Cir. 1998); *York Prods., Inc. v. Central Tractor Farm & Family Ctr.*, 99 F.3d 1568, 1572, 40 USPQ2d 1619, 1622 (Fed. Cir. 1996)). "It is well settled that

dictionaries provide evidence of a claim term's 'ordinary meaning.'" *Inverness Med. Switz. GmbH v. Warner Lambert Co.*, 309 F.3d 1365, 1369, 64 USPQ2d 1926, 1930 (Fed. Cir. 2002) (citing *Texas Digital Sys. Inc. v. Telegenix Inc.*, 308 F.3d 1193, 1202, 64 USPQ2d 1812, 1818 (Fed. Cir. 2002); *CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1366, 62 USPQ2d 1658, 1662 (Fed. Cir. 2002)).

Here, claim 5 specifies in pertinent part the following limitations: "a layer of neat dielectric polymer or glass **distinct from** the layer of variable voltage material. . . ." (Emphasis added.) The term "distinct" is defined as "distinguishable from all others; separate; discrete. . . ." *American Heritage Dictionary* 411 (2d College ed. 1982) (copy attached). Giving the terms in the claim their ordinary and accustomed meaning, we conclude that one skilled in the art would understand that the limitations require a layer of neat dielectric polymer or glass separate from a layer of variable voltage material.

Third, the examiner asserts, "[t]he term 'in contact with' anywhere it appears such as claim[] . . . 11 is not clear where applicant argues that the term is used to denote contact for purposes of establishing a voltage discharge path." (Examiner's Answer at 4.) The appellants argue, "[o]ne of ordinary skill in the art, looking at appellants' disclosure, would be readily apprised of the meaning of 'in contact with'

because the disclosure sets forth various parameters describing the relationship of the layers." (Appeal Br. at 9.)

Here, claim 11 specifies in pertinent part the following limitations: "a second layer of variable voltage protection material **in contact with** the first layer . . . and a third layer of variable voltage protection material **in contact with** said second layer. . . ." (Emphases added.) The term "contact" is defined as "the coming together or touching of two objects or surfaces." *American Heritage Dictionary* at 315. Giving the terms in the claim their ordinary and accustomed meaning, we conclude that one skilled in the art would understand that the limitations require that surfaces of the claimed layers touch one another.

Fourth, the examiner asserts, "[i]n claim[] . . . 31, 'which is in direct contact with an electrical conductor' is not clear where no such conductor is claimed, as it is not clear if the contact or conductor is required, and since it is not claimed, it cannot be in contact therewith." (Examiner's Answer at 4.) The appellants argue, "[t]he relationship between the layer of neat dielectric polymer or glass and the electrical conductor is clearly and unambiguously set out." (Appeal Br. at 8.)

Claim 31 specifies in pertinent part the following limitations: "a layer of neat dielectric polymer or glass which is in direct contact with an electrical conductor in said electronic circuit. . . ." We conclude that one skilled in the art would understand that the limitations require a layer of neat dielectric polymer or glass that is in direct contact with an electrical conductor in an electronic circuit.

Fifth, the examiner asserts, "[i]t is not clear if the volume is 'different' because the volumes occupy different spaces, or they have different percentage loadings." (Examiner's Answer at 14.) The appellants argue, "[t]he term 'different' as used in [c]laims 31-32 clearly distinguishes the compositions of the two layers of variable voltage material." (Appeal Br. at 9.)

Here, claim 31 specifies in pertinent part the following limitations: "a binder having dispersed therein conductive and/or semiconductive particles at a 40% by volume, **which volume is different than** in said first layer." (Emphasis added.) Also similarly, claim 32 specifies in pertinent part the following limitations: "a binder having dispersed therein conductive or semiconductive particles at a 20 by volume, **which volume is different than** the second layer." (Emphasis added.) For its part, the specification discloses that "the multiple layer construction provides an opportunity to vary the conductor particle loading and/or semiconductor particle loading in each layer,

such that the outer layers contain lower particle loadings than the inner layer, in order to achieve a wide range of clamping voltages and other desired properties." (Spec. at 5.) Reading the claims in light of the specification, we conclude that one skilled in the art would understand that the claimed volumes differ in their percentage loadings of conductive or semiconductive particles. Therefore, we reverse the indefiniteness rejection of claims 5-20 and 30-32.

Anticipation Rejection of Claims 5-10 and 31 over Kouchich

We address the main point of contention between the examiner and the appellants. The examiner asserts, "[t]he glass layer (labeled as 9 and shaded dark by the Examiner - see Appendix) near electrode 3 is a distinct layer where it is devoid of the conductor particles." (Examiner's Answer at 5.) The appellants argue, "Kouchich, et al. only shows one composition, and therefore fails to anticipate the invention. . . ." (Appeal Br. at 13.)

"Analysis begins with a key legal question -- *what* is the invention *claimed*?" *Panduit Corp. v. Dennison Mfg. Co.*, 810 F.2d 1561, 1567, 1 USPQ2d 1593, 1597 (Fed. Cir. 1987). Here, claim 5 specifies in pertinent part the following limitations: "a layer of neat dielectric polymer or glass distinct from the layer of variable voltage material and in

contact with one surface of the layer of variable voltage material. . . ." Similarly, claim 31 specifies in pertinent part the following limitations: "a first layer of variable voltage protection material in contact with said layer of neat dielectric polymer or glass . . ." Giving the terms in the claims their ordinary and accustomed meaning, the limitations require a layer of variable voltage material separate from, but touching, a layer of neat dielectric polymer or glass.

"Having construed the claim limitations at issue, we now compare the claims to the prior art to determine if the prior art anticipates those claims." *In re Cruciferous Sprout Litig.*, 301 F.3d 1343, 1349, 64 USPQ2d 1202, 1206 (Fed. Cir. 2002). "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros., Inc. v. Union Oil Co.*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987) (citing *Structural Rubber Prods. Co. v. Park Rubber Co.*, 749 F.2d 707, 715, 223 USPQ 1264, 1270 (Fed. Cir. 1984); *Connell v. Sears, Roebuck & Co.*, 722 F.2d 1542, 1548, 220 USPQ 193, 198 (Fed. Cir. 1983); *Kalman v. Kimberly-Clark Corp.*, 713 F.2d760, 771, 218 USPQ 781, 789 (Fed. Cir. 1983)). "[A]bsence from the reference of any claimed element negates anticipation." *Kloster Speedsteel AB v. Crucible, Inc.,* 793 F.2d 1565, 1571, 230 USPQ 81, 84 (Fed. Cir. 1986).

Here, although Kouchich discloses a layer of variable voltage material, viz., "a varistor composition 1," col. 4, ll. 36, the reference does not include a layer of neat dielectric polymer or glass touching the varistor composition. To the contrary, the varistor composition is "interposed between a pair of electrodes 3. . . ." *Id.* at ll. 36-37. The absence from Kouchich of a layer of variable voltage material separate from, but touching, a layer of neat dielectric polymer or glass negates anticipation. Therefore, we reverse the anticipation rejection of claims 5 and 31 and of claims 6-10, which depend from the former, over Kouchich.

Obviousness Rejection of Claims 5-10 over Xu

At the outset, we recall that claims that are not argued separately stand or fall together. *In re Kaslow*, 707 F.2d 1366, 1376, 217 USPQ 1089, 1096 (Fed. Cir. 1983) (citing *In re Burckel*, 592 F.2d 1175, 201 USPQ 67 (CCPA 1979)). When the patentability of a dependent claim is not argued separately, in particular, the claim stands or falls with the claim from which it depends. *In re King*, 801 F.2d 1324, 1325, 231 USPQ 136, 137 (Fed. Cir. 1986) (citing *In re Sernaker*, 702 F.2d 989, 991, 217 USPQ 1, 3 (Fed. Cir. 1983); *In re Burckel*, 592 F.2d 1175, 1178-79, 201 USPQ 67, 70 (CCPA 1979)). Furthermore, "[m]erely pointing out differences in what the claims cover is not an argument as to why the claims are separately patentable." 37 C.F.R. § 1.192(c)(7).

Here, although the appellants point out differences in what claims 5, 6, and 7 cover, (Appeal Br. at 15), this is not an argument why the claims are separately patentable. Furthermore, they do not argue the patentability of claim 8 separately. Therefore, claims 6- 8 stand or fall with representative claim 5.

With this representation in mind, we address the four points of contention between the examiner and the appellants. First, the examiner asserts, "layer 62 is shown at a constant thickness lying over stratum 21 in Fig.16. . . ." (Examiner's Answer at 17.) The appellants argue, "composite material (62) applied through the holes in cover (41) does not satisfy the definition of 'layer.'" (Appeal Br. at 14.)

"[T]he Board must give claims their broadest reasonable construction. . . ." *In re Hyatt*, 211 F.3d 1367, 1372, 54 USPQ2d 1664, 1668 (Fed. Cir. 2000). Here, claim 5 specifies in pertinent part the following limitations: "a **layer** of variable voltage material. . . ." (Emphasis added.) The term "layer" is defined as "[a] single thickness, coating, or stratum spread out or covering a surface." *American Heritage Dictionary* at 719 (copy attached). Giving the claim its broadest, reasonable construction, the limitations require a thickness, coating, or stratum of variable voltage material spread out or covering a surface.

Having determined what subject matter is being claimed, the next inquiry is whether the subject matter would have been obvious. The question of obviousness is "based on underlying factual determinations including . . . what th[e] prior art teaches

explicitly and inherently. . . ." *In re Zurko*, 258 F.3d 1379, 1386, 59 USPQ2d 1693, 1697(Fed. Cir. 2001) (citing *Graham v. John Deere Co.*, 383 U.S. 1, 17-18, 148 USPQ 459, 467 (1966); *In re Dembiczak*, 175 F.3d 994, 998, 50 USPQ 1614, 1616 (Fed. Cir. 1999); *In re Napier*, 55 F.3d 610, 613, 34 USPQ2d 1782, 1784 (Fed. Cir. 1995)).

Here, Xu discloses "an electrical overstress pulse protection composite 62. . . ." Col. 5, ll. 30-31. We find that the electrical overstress pulse protection composite is spread out in, and covers the side and bottom surfaces, of an opening. Specifically, "each of the openings 43 in the cover 41 is filled with an electrical overstress pulse protection composite 62 (see FIG. 12). . . . The composite is applied in a sufficiently fluid state as to enter the space 34. . . ." *Id.* at ll. 29-33.

Second, the examiner asserts that Xu discloses "polymer 41, in contact with variable voltage material 62. . . ." (Examiner's Answer at 6.) The appellants argue, "[c]over (41) does not overlie composite material (62) and plays no role during actual over-voltage protection operation." (Appeal Br. at 14.)

"[L]limitations are not to be read into the claims from the specification." *In re Van Geuns*, 988 F.2d 1181, 1184, 26 USPQ2d 1057, 1059 (Fed. Cir. 1993) (citing *In re Zletz*, 893 F.2d 319, 321, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989)). Here, claim 5 specifies in pertinent part the following limitations: "a layer of neat dielectric polymer or

glass distinct from the layer of variable voltage material and in contact with one surface of the layer of variable voltage material. . . ." Despite the appellants' argument, the limitations require neither that the layer of neat dielectric polymer or glass overlie the layer of variable voltage material nor play a role during an over-voltage protection operation. Accordingly, the argument is moot.

Third, observing that "[a] dimension of .2 mils and 50 mils is described in conjunction with 'thin' for prior art flexible electrodes," (Examiner's Answer at 6), the examiner asserts, "it would have been obvious to employ the polymer of Xu et al. in the claimed range for the purpose of making a thin flexible layer. . . ." (*Id.* at 6-7.) The appellants argue, "one of ordinary skill in the art would not be motivated by the teachings of Xu, et al. to use a neat dielectric polymer or glass in the claimed thicknesses. . . ." (Appeal Br. at 15.)

Claim 5 specifies in pertinent part the following limitations: "the neat dielectric polymer or glass layer is present in a thickness of less than about 1.6 mils."

"All of the disclosures in a reference must be evaluated for what they fairly teach one of ordinary skill in the art." *In re Boe*, 355 F.2d 961, 965, 148 USPQ 507, 510 (CCPA 1966)). "'A *prima facie* case of obviousness is established when the teachings

from the prior art itself would . . . have suggested the claimed subject matter to a person of ordinary skill in the art.'" *In re Bell*, 991 F.2d 781, 783, 26 USPQ2d 1529, 1531 (Fed. Cir. 1993) (quoting *In re Rinehart*, 531 F.2d 1048, 1051, 189 USPQ 143, 147 (CCPA 1976)).

Here, Xu discloses that the thickness of a "**thin** lamina electrode," col. 3, l. 8 (emphasis added), is "about 0.2 to 35 mils. . . ." *Id.* at l. 10. By describing its "flexible laminate," *id.* at l. 20, as "**very** thin," *id.* at l. 19 (emphasis added), the reference implies that the thickness of the latter is less than thickness of the **thin** lamina electrode. Because the thickness of the lamina electrode is at least 0.2 mils, one of ordinary skill in the art would have inferred that the thickness of the **very thin** flexible laminate is less than 0.2 mils. Such a thickness is less than the claimed "about 1.6 mils." Therefore, we affirm the obviousness rejection of claim 5 and of claims 6-8, which fall therewith, over Xu.

Fourth, the appellants argue, "[c]laims 9 and 10 recite a second layer of neat dielectric polymer or glass in contact with a second surface of the layer of variable voltage material. Xu, et al. neither teaches nor suggests such a second layer, and the examiner does not address this omission." (Appeal Br. at 15.)

"In rejecting claims under 35 U.S.C. Section 103, the examiner bears the initial burden of presenting a *prima facie* case of obviousness." *In re Rijckaert*, 9 F.3d 1531, 1532, 28 USPQ2d 1955, 1956 (Fed. Cir. 1993)(citing *In re Oetiker*, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992)). Here, the examiner fails to allege, let alone show, however, that Xu teaches or would have suggested the limitations of claims 9 and 10. We will not "resort to speculation," *In re Warner*, 379 F.2d 1011, 1017, 154 USPQ 173, 178 (CCPA 1967), as to his unstated position. Therefore, we reverse the obviousness rejection of claims 9 and 10 over Xu.

Obviousness Rejection of Claims 11-16 over Slepian and Hyatt

At the outset, we note that the appellants do not argue claims 11-16 separately. Therefore, claims 12-16 stand or fall with representative claim 11. With this representation in mind, we address the main point of contention between the examiner and the appellants. The examiner asserts, "Hyatt discloses conductive and semiconductive particles at 70% at col. 5, lines 20-40, for the purpose of providing overvoltage protection and to tailor the resistance to the desired value and altering the clamping voltage, col. 9, lines 13-21. It would have been obvious in view of Hyatt to employ particles in the claimed range in the device of . . . Slepian for the purpose of altering the resistance and clamping voltage." (Examiner's Answer at 7.) The

appellants argue, "[n]one of these references teach the use of different layers having different particle loadings. . . ." (Appeal Br. at 17.)

Claim 11 specifies in pertinent part the following limitations: "a first layer . . . comprising a binder having dispersed therein at least about 20% by volume of conductive or semiconductive particles; a second layer . . . comprising a binder having dispersed therein at least 40% by volume of conductive and/or semiconductive particles; and a third layer . . . comprising a binder having dispersed therein at least 20% by volume of conductive or semiconductive particles." Giving the claim its broadest, reasonable construction, the limitations merely require that a first and third layer feature a percentage loading of at least about 20% by volume of conductive or semiconductive particles and that a second layer features a percentage loading of at least about 40% by volume of conductive or semiconductive particles. Despite the appellant's argument, however, the limitations do not require that the layers feature different particle loadings.

For its part, Hyatt discloses "a composition . . . of materials which can be connected to, or incorporated as part of an electrical circuit or circuit component, and are characterized by high electrical resistance values when exposed to low or normal operating voltages, but essentially instantaneously switch to low

electrical impedance values in response to an excessive or overstress voltage pulse, thereby shunting the excessive voltage or overstress pulse to ground." Col. 1, ll. 17-25. The reference's composition comprises a binder having dispersed therein at least 55% by volume of conductive or semiconductive particles. More specifically, "[i]n the practice of [Hyatt's] invention, the key electrical ingredient of the composite is a mixture of conductor/semiconductor particles, constituting from about 55 to about 80%, and preferably from about 60 to about 70%, by volume of the composite." Col. 5, ll. 20-24.

We find that when the composition of Hyatt was used in the device of Slepian, the combination would have featured at least three layers, wherein each layer would have featured a percentage loading of at least about 55% by volume of conductive or semiconductive particles. Such a loading would have satisfied the requirement that a first and third layer feature a percentage loading of at least about 20% by volume of conductive or semiconductive particles and that a second layer features a percentage loading of at least about 40% by volume of conductive or semiconductive particles. Therefore, we affirm the obviousness rejection of claim 11 and of claims 12-16, which fall therewith, over Slepian and Hyatt.

Obviousness Rejection of Claims 11-20 over Downing and Hyatt

We address the two points of contention between the examiner and the appellants. First, the examiner asserts, "Hyatt discloses conductive and semiconductive particles at 70% at col. 5, lines 20-40, for the purpose of providing overvoltage protection and to tailor the resistance to the desired value and altering the clamping voltage, col. 9, lines 13-21. It would have been obvious in view of Hyatt to employ particles in the claimed range in the device of Downing et al. or Slepian for the purpose of altering the resistance and clamping voltage." (Examiner's Answer at 7.) The appellants argue, "[n]one of these references teach the use of different layers having different particle loadings. . . ." (Appeal Br. at 17.)

As explained regarding the obviousness rejection over Slepian and Hyatt, claim 11 merely requires that a first and third layer feature a percentage loading of at least about 20% by volume of conductive or semiconductive particles and that a second layer features a percentage loading of at least about 40% by volume of conductive or semiconductive particles. It does not require that layers feature different particle loadings.

As also explained regarding the obviousness rejection over Slepian and Hyatt, Hyatt's composition comprises a binder having dispersed therein at least 55% by volume of conductive or semiconductive particles. We find that when the composition

of Hyatt was used in the device of Downing, the combination would have featured at least three layers, wherein each layer would have featured a percentage loading of at least about 55% by volume of conductive or semiconductive particles. Such a loading would have satisfied the requirement that a first and third layer feature a percentage loading of at least about 20% by volume of conductive or semiconductive particles and that a second layer features a percentage loading of at least about 40% by volume of conductive or semiconductive particles. Therefore, we affirm the obviousness rejection of claim 11 and of claims 12-16, which fall therewith, over Downing and Hyatt.

Second, admitting that Downing and Hyatt fail to disclose "a dielectric polymer or glass in the claimed range in contact with the component," (Examiner's Answer at 9), the examiner concludes, "[i]t would have been obvious to vary the thickness of the insulation layer of Downing to within the claimed range for the purpose of providing a close fit in the housing, where close jacketing is disclosed at col. 3, lines 47-50." (*Id.* at 9-10). The appellants argue, "[t]here is no teaching or suggestion in either Downing, et al., or Hyatt that this insulation cover can be used as one (Claims 17 and 18), or two (Claims 19 and 20), layers of the protection device, at least one of which is 1.6 mils in thickness." (Appeal Br. at 18-19.)

Claims 17 and 18 specify in pertinent part the following limitations: "a layer of neat dielectric polymer or glass in contact with at least one of said first, second and third layers wherein the neat dielectric polymer or glass layer is present in a thickness of less than about 1.6 mils." Giving the claims their broadest, reasonable construction, the limitations require a layer of neat dielectric polymer or glass featuring a thickness of less than about 1.6 mils.

"In *In re Aller*, 42 CCPA 824, 220 F.2d 454, 105 USPQ 233 (1955), the [U.S. Court of Customs and Patent Appeals] set out the rule that the discovery of an optimum value of a variable in a known process is normally obvious." *In re Antonie*, 559 F.2d 618, 621, 195 USPQ 6, 8 (CCPA 1977). There are, however, exceptions to the rule. The case "in which the parameter optimized was not recognized to be a result-effective variable, is [one such] exception." *Id.* at 621, 195 USPQ at 9. *See also In re Yates*, 663 F.2d 1054, 1057, 211 USPQ 1149, 1151 (CCPA 1981) ("Table 1 examples, taken as a whole, support appellant's position that degree of conversion was not recognized to be a result-effective variable.")

Here, although the passage cited by the examiner mentions that Downing's "unitary assembly of varistors is closely jacketed by an insulation cover 28 (FIGURE 2) whereby the unit may be inserted into the cylindrical shell 12 and potted therein with

potting compound 14p," col. 3, ll. 47-50, the examiner fails to show that the prior art as a whole recognized that the output of the assembly of varistors would have been affected by adjusting the thickness of its insulation cover 28. Recognition of this dependence is essential to the obviousness of conducting experiments to decide the thickness that will offer an acceptable output. The examiner gives no basis for the obviousness of the necessary experiments apart from the appellants' disclosure thereof. Therefore, we reverse the obviousness rejection of claims 17 and 18 and of claims 19 and 20, which respectively depend therefrom, over Downing and Hyatt.

Obviousness Rejections of Claims 17-20 over Slepian, Hyatt, and Beck and over Downing, Hyatt, and Beck

At the outset, we note that although the appellants point out differences in what claims 17-20 cover, (Appeal Br. at 17), this is not an argument why the claims are separately patentable. Therefore, claims 18-20 stand or fall with representative claim 17.

With this representation in mind, we address the two points of contention between the examiner and the appellants. First, the appellants repeat their argument that none of the references teach the use of different layers having different particle loadings. To wit, they argue that "Beck, at al. also does not teach differently formulated layers of variable voltage material." (Appeal Br. at 18.) For the reasons explained

regarding the obviousness rejection over Slepian and Hyatt, claim 17 does not require that layers feature different particle loadings. As also explained regarding the obviousness rejection over Slepian and Hyatt, Hyatt's loading would have satisfied the requirement that a first and third layer feature a percentage loading of at least about 20% by volume of conductive or semiconductive particles and that a second layer features a percentage loading of at least about 40% by volume of conductive or semiconductive particles. Therefore, we affirm the obviousness rejection of claim 17 and of claims 18-20, which fall therewith, over Downing, Hyatt, and Beck.

Second, observing that "Beck discloses the polymer or glass layer 4 in the claimed range at col. 2, lines 1-10 for the purpose of adjusting the voltage characteristics," (Final Rejection at 6), the examiner asserts, "[i]t would have been obvious in view of Beck to employ a polymer or glass layer in the device of Downing or Slepian as modified for the purpose of adjusting the breakdown voltage." (*Id.*) The appellants do not contest the combination of Beck with Downing and Hyatt. They only argue, "Beck, et al. actually teaches away from a combination with Slepian, and from the invention, by stating that 'discharge devices of the type in which the electrodes are separated by solid dielectric material, such as paper or mica, are not suitable [for applications contemplated by Beck, et al.] because the dielectric is punctured by the discharge, thus forming an air gap which has high breakdown voltage.'" (Appeal Br.

at 18.) The appellants add, "Slepian, it will be appreciated, discloses exactly such a discharge device, with spacer (7) of Slepian being selected of mica (see Slepian, p.2, col. 1, 34)." (*Id.*)

"[P]rior art references . . . must be read as a whole and consideration must be given where the references diverge and teach away from the claimed invention." *Akzo N.V. v. U.S. Intn'l Trade Comm'n*, 808 F.2d 1471, 1481, 1 USPQ2d 1241, 1246 (Fed. Cir. 1986) (citing *W.L. Gore & Assocs. v. Garlock*, 721 F.2d 1540, 1550, 220 USPQ 303, 311 (Fed. Cir. 1983)).

Here, Slepian discloses "disk-pile lightening arresters. . . ." P. 1, ll. 10-11. We agree with the appellants that the spacers of such an arrester are made of mica. Specifically, the reference "place[s] between the plates thin washers or spacers of suitable material . . . such as mica." P. 2, ll. 31-36. Although Slepian does not mention using a dielectric polymer or glass for the spacers of its embodiments, the reference emphasizes, "it is obvious that my invention is not limited to the details shown and described." P. 2, ll. 50-51. To the contrary, we find that Slepian invites changes to its embodiments. Specifically, the reference asserts that "changes may be made in my invention. . . ." *Id.* at ll. 61-62.

We further find that Beck recognize a problem facing the use of mica. Specifically, "discharge devices of the type in which the electrodes are separated by solid dielectric material, such as paper or mica, are not suitable for such applications because the dielectric is punctured by the discharge, thus forming an air gap which has high breakdown voltage." P. 2, ll. 19-24. We also find that the latter reference solves the problem of the high breakdown voltage associated with mica by substituting a dielectric layer. Specifically, "lower electrode has an insulating coating 4 applied to its surf ace to constitute the dielectric layer which separates the two electrodes. This dielectric layer is made very thin in order to provide a low breakdown voltage, and its thickness is preferably in the range from one-half to 5 mils. . . ." P. 1, l. 54 to p. 2, l. 5. Because Beck invites changes to it embodiments, and Beck solves the problem of the high breakdown voltage associated with mica, we find that a suggestion, teaching, or motivation to combine, rather than a teaching away, flows from the references themselves. Therefore, we affirm the obviousness rejection of claim 17 and of claims 18-20, which fall therewith, over Slepian, Hyatt, and Beck.

Obviousness Rejections of Claim 31 over Downing and Hyatt; over Downing, Hyatt, and Beck; and over Slepian, Hyatt, and Beck

We address the main point of contention between the examiner and the appellants. The examiner asserts, "[e]ach layer 22 of Downing or 1 of Slepian is 'distinguishable to the mind or eye as discrete'." (Examiner's Answer at 19.) The appellants argue that the references "fail to teach or suggest a variable voltage protection component having two differently formulated layers of variable voltage material in combination with a first layer of neat dielectric polymer or glass (Claim 31)." (Appeal Br. at 17.)

Claim 31 specifies in pertinent part the following limitations: "a first layer of variable voltage protection material in contact with said layer of neat dielectric polymer or glass and comprises a binder having dispersed therein at least about 20 % by volume of conductive or semiconductive particles; and a second layer of variable voltage protection material in contact with the first layer of variable voltage protection material comprising a binder having dispersed therein conductive and/or semiconductive particles at a 40 % by volume, which volume is different than in said first layer." For the reasons explained regarding the indefiniteness rejection, claim 31 requires that a first layer and a second layer differ in their percentage loadings of conductive or semiconductive particles.

Turning to the prior art, although Downing discloses "a stack of: exemplary disc-like polycrystalline semiconductive resistive devices which in this case are chosen to be silicon carbide varistors," col. 2, ll. 64-68, the examiner fails to show that the varistors differ in their percentage loadings of conductive or semiconductive particles. Similarly, although Slepian discloses that "[a] plurality of plates 1 of high-resistance material, preferably but not necessarily containing graphite, carborundum and kaolin, are placed in superposed relation as shown in Fig. 1," p. 2, ll. 11-15, the examiner fails to show that the plates differ in their percentage loadings of conductive or semiconductive particles. For its part, although Hyatt discloses a composition featuring a percentage loading of at least about 55% by volume of conductive or semiconductive particles, the examiner fails to show that the reference teaches using different loadings in different layers of a device. In summary, we are persuaded that the fairest reading of the references is to use the same loading in different layers of a device.

Furthermore, the examiner fails to allege, let alone show, that the addition of Beck cures the aforementioned deficiency of Downing, Slepian, and Hyatt. Absent a teaching or suggestion of a first layer and a second layer differ in their percentage loadings of conductive or semiconductive particles, the examiner fails to present a *prima facie* case of obviousness. Therefore, we reverse the obviousness rejections of

claim 31 over Downing and Hyatt, over Downing, Hyatt, and Beck; and over Slepian, Hyatt, and Beck.

CONCLUSION

In summary, the rejection of claims 5-20 and 30-32 under 35 U.S.C. § 112, ¶ 2; the rejection of claims 5-10 and 31 under § 102(b) over Kouchich; the rejection of claims 9 and 10 under § 103(a) over Xu; the rejection of claims 17-20 under § 103(a) over Downing and Hyatt are reversed. The rejections of claim 31 under § 103(a) over Downing and Hyatt; over Downing, Hyatt, and Beck; and over Slepian, Hyatt, and Beck are also reversed. In contrast, the rejection of claims 5-8 under § 103(a) over Xu; the rejections of claims 11-16 under § 103(a) over Downing and Hyatt and over Slepian and Hyatt; and the rejections of claims 17-20 under § 103(a) over Downing, Hyatt, and Beck and over Slepian, Hyatt, and Beck are affirmed.

"Any arguments or authorities not included in the brief will be refused consideration by the Board of Patent Appeals and Interferences. . . ." 37 C.F.R. § 1.192(a)(2002). Accordingly, our affirmance is based only on the arguments made in the briefs. Any arguments or authorities not included therein are neither before us nor at issue but are considered waived. No time for taking any action connected with this appeal may be extended under 37 C.F.R. § 1.136(a).

AFFIRMED-IN-PART

JAMES D. THOMAS Administrative Patent Judge	)
LANCE LEONARD BARRY Administrative Patent Judge	) BOARD OF PATENT) APPEALS) AND) INTERFERENCES
STUART S. LEVY Administrative Patent Judge	)

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